Liverpool John Moores University

Title:	MODERN SYNTHESIS
Status:	Definitive
Code:	**6004APCHEM** (121138)
Version Start Date:	01-08-2021
Owning School/Faculty:	Pharmacy & Biomolecular Sciences
Teaching School/Faculty:	Pharmacy & Biomolecular Sciences

Team	Leader
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Academic Level:	FHEQ6	**Credit Value:**	20	**Total Delivered Hours:**	39
Total Learning Hours:	200	**Private Study:**	161		

Delivery Options
Course typically offered: Semester 2

Component	Contact Hours
Lecture	23
Tutorial	2
Workshop	12

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	Exam	70	2
Report	Report	Report	30	

Aims

To convey some of the most important modern chemical transformations involved in pharmaceutical, agrichemical and materials science. This will equip the learner with the theoretical knowledge that will be applied in the industrial setting.

Learning Outcomes

After completing the module the student should be able to:

1 Devise successful routes to molecules requiring several synthetic steps.
2 Employ frontier molecular orbital theory with respect to pericyclic reactions e.g. Diels-Alder.
3 Predict how radicals and other reactive species can be used in synthesis and ionic rearrangements.
4 Utilise transition metal-mediated chemistry to form C-C bonds.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Examination	1	3	4
Report	2	4	

Outline Syllabus

The student will be introduced to contemporary methods for organic synthesis and will learn how to plan a successful synthetic route. Including, some useful oxidation methods, such as epoxidation and dihydroxylation. Frontier molecular orbital theory with respect to pericyclic reactions e.g. Diels-Alder, and the role of reactive intermediates in organic synthesis e.g. radicals, carbenes, nitrenes, ionic rearrangements. Transition metal mediated processes (stoichiometric and catalytic): 1) homogeneous hydrogenation and asymmetric catalysis; 2) catalytic and stoichiometric oxidation reactions; 3) organopalladium intermediates synthesis e.g. Suzuki, Sonagashira, Stille, Heck cross-coupling reactions.

Learning Activities

Lectures, workshops and tutorials

Notes

The module will cover up-to-date methods of bond synthesis, allowing access to important molecules in terms of the materials applications covered elsewhere. This will include considerable emphasis on transition metal-mediated processes. Learning outcomes will be supported by workshops, following a problem-solving based exercise with peer-learning opportunity. This will include problems involving the correct assignment of structures, reagents, reaction conditions and mechanistic details.